SOME OBSERVATIONS

ON THE

TUBERCULAR OR GYPSEOUS DISEASE OF THE LOWER ANIMALS.

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On the morning of Tuesday the 4th of July 1843, I sent a person to the public market in order to obtain the lungs of an ox, with the view of making some observations on the bronchial mucous membrane and its follicles. The lungs were indeed brought me; but in a state so changed by disease, that I found my anatomical inquiry converted into a pathological one.

While one of the lungs was tolerably sound, the other was occupied by many hard round masses of a gray or cream colour, which gave the idea of the encephalomatous tumour. Many of these were situate immediately beneath the pleura; others were manifestly in the substance of the lungs; and others seemed to be placed around the bronchial tubes. They varied in size from a garden pea to masses as large as a small pippin. In general the smallest bodies were situate towards the margin of the lungs; and the largest close round the bronchial tubes; but to this there were several exceptions. Upon dividing by the knife some of the largest masses, as well as several of the smallest bodies, I at once recognized them as the tubercular, or rather tyromatous and gypseous masses described by M. Dupuy; and, as such, I think some short notice of their anatomical and pathological relations may be not entirely void of interest.

Some of the large masses, not immediately enclosing the bronchial tubes, formed hard prominent tumours, irregular on the sur-

face. When divided they consisted of a firm hard capsule, cartilaginous in consistence or almost bony, and enclosing a quantity of gray or fawn-coloured soft matter, of the consistence of chalk or meal moistened with water. This interior matter was not arranged in any definite or regular order. Sometimes it seemed to consist of a number of globular or roundish masses various in size, aggregated together. These presented, however, no fibrous structure, or lamellated or stratified arrangement.

The masses or tumours outside the bronchial tubes were mostly small or middle-sized. They were, in like manner as the others, hard, firm, and irregular on the surface. When divided, they consisted of an external firm capsule, enclosing the same grayish or fawn-coloured putty-like matter, equally without definite structure, as in the other tumours. Though situate on the outside of the bronchial tubes, they had in many instances advanced through the substance or walls of the tubes to their inner surface, and formed there soft, spongy, fawn-coloured tumours, projecting above the mucous membrane, and with an irregular surface or apex, the outline of which also was irregular. At the points where these tumours had thus found their way into the inner part or cavity of the bronchial tubes, the mucous membrane had been destroyed, or at least it was in its integrity no longer perceptible. This destruction of parts by the progressive advancement of the disease was chiefly observed in the largest and middle-sized tubes. In the smallest it was either not so far advanced, that is, it had not proceeded through the walls of the tubes, and was still confined to their external surface, or it had done so in one or two points only. In the large tubes, on the other hand, this species of ulcerative destruction, for such it appeared truly to be, had taken place in six, eight, or ten points of the tube or tubes, successively or simultaneously.

The tubes thus attacked were rendered rough and irregular on their inner or mucous surface by fawn-coloured fungous-looking masses, varying in size, number, and shape. Another change also they had undergone in secretion. All the tubes in any degree affected by the tumours were filled with viscid glairy mucus, in some parts streaked with blood, and which lay in long ropy cylinders along their interior, projecting also from the small tubes into the large ones. The membrane, nevertheless, could not be said to be reddened or thickened. It was rather pale coloured; perhaps a little softened.

The matter contained in the bronchial glands in this case, which corresponds in all respects to what I have elsewhere termed tyromatous (Τυρωμα, *Caseus*), was quite homogeneous, and void of distinct organization. Even when placed under the microscope, it could not be said to present distinct traces of organization.

When treated with nitric acid diluted with an equal weight of water, this substance became more yellow and firmer; but at the same time rendered the liquor turbid, and gave it a greenish-yellow colour.

From the circumstances under which this specimen of morbid structure was obtained, it was impracticable to procure any information regarding the state or symptoms of the animal during life. That the animal, however, laboured under a severe affection of the lungs, with breathlessness, cough, and the discharge of much inflammatory mucus from the windpipe, is manifest, and must be inferred from the appearances presented after death. It may be further inferred from the destruction of the bronchial membrane in several of the tubes, that the animal would present a set of symptoms very similar to those of pulmonary consumption. Considerable wasting must have taken place; the animal must have been emaciated and extremely feeble; and there can be little doubt had for some time laboured under symptoms of habitual or hectic fever. The natural tendency of such a malady is to death; and it is a conclusion not only natural but necessary, that this animal must have speedily died of the lesions of the bronchial tubes already described.

In the example of bronchial disease now recorded, the bronchial tubes and membrane appear not to have been first affected. The first and earliest marks of disease appeared in the bronchial glands outside the tubes, and the bronchial textures and membrane were affected only secondarily, and after a considerable time. This is the reverse of the usual course, or at least of what is supposed to be the usual course of morbid action in these parts. It is usually believed that the bronchial membrane or its follicles are first affected; and then that the ulceration spreads from within outwards; and further, that the bronchial glands become enlarged, irritated, and diseased only in consequence of the previous affection of the bronchial membrane. So far as a judgment could be framed in this case, the bronchial glands had caused the inflammation and ulceration of the bronchial tubes and the mucous membrane; and had not the former bodies been so much enlarged as to press on the latter, the latter would not have become ulcerated.

No doubt can be entertained that the case, the outlines of which have been here detailed, is an example of the disease which has been described under the name of tubercular and gypseous or plaster-like in the ox. This Dupuy places along with, and considers as analogous to, if not identical with* the glanders

* De l'Affection Tuberculeuse vulgairement appellée Morve, Pulmonie, Gourme, Farcin, Fausse Gourme, Pommeliere, Phthisie du Singe, du Chat, du Chien, et

in the horse; but for this arrangement I cannot see any good reason. It doubtless tends to destroy the lungs of the animal, as certainly as the glanders does that of the horse. But it does not accomplish this destruction in the same manner, neither does it attack the same textures.

In the ox this disease attacks first the bronchial glands, and then proceeds to destroy the bronchial tubes, in which it produces ulceration with a glairy mucous discharge from the mucous surface of the bronchial tubes. In the course of this process, however, the tyromatous masses, by their size and situation, must have compressed much not only the large bronchial tubes, which they closely embraced, but also the middle-sized tubes, the substance of the lungs, and even the blood-vessels. In short these tyromatous masses, partly by compressing the bronchial tubes and contiguous portions of the lung, partly by causing ulceration in the former, brought about a state of health incompatible with the continuance of life.

In glanders in the horse, it is well known that the disease betrays its action in general first on the Schneiderian membrane; that it produces tubercles and bad ulcers in the whole of this membrane, and eventually affects the subjacent bones, so that the bones of the nasal passages are generally in a state of *caries* before the death of the animal. From the nasal cavities and membrane it proceeds to the lungs, where it causes either pneumonia or tubercular destruction of these bodies. The disease here described does not show itself in this manner in the ox.

In another respect there appears a difference not less striking. In glanders both in the horse and in the human subject, the animal poison produces in the lungs a sort of gangrenous pneumonia, in other words, gangrene of the lungs. This, indeed, actually took place in a patient of my own in the Royal Infirmary in the course of this last winter, in whom symptoms of chronic farcy appeared,* and it seems a common result in the horse, according to Dupuy, and also Rayer. In this disease, however, gangrene is very rarely, or rather never observed to take place; and the structure of the lungs is destroyed and their functions impaired, as I have already said, by ulcerative openings in the bronchial tubes, by the fungating growths projecting into their interior, and by the profuse discharge of viscid mucus, the product of inflammation.

If there be any foundation for the opinion of M. Dupuy, it is frightful to think that the flesh of animals destroyed by this dis-

des Oiseaux Domestiques; Comparée a l'Affection l'Hydatideuse ou pourriture du mouton, du lapin, du lievre, et a la ladrerie du Cochon. Par M. Dupuy, Medecin-Veterinaire, et Professeur a l'Ecole Royale et Economie Rurale et Veterinaire, d'Alfort, &c. Paris, 1817, p. 253; Quatrieme Division.

* Edinburgh Medical and Surgical Journal, Vol. liv. p. 127.

ease is exposed in the public markets for food. Though I could obtain no information about the history of the ox in which the bronchial glands were diseased, there cannot be a doubt that its flesh was sold in the usual manner, and found its way into the interior of a certain number of the lieges.

I have said that this is an instance of the disease described by Dupuy as occurring in cattle, and known under the various denominations of *pommeliere,* or apple disease, chronic consumption, diarrhœa of calves, mesenteric atrophy, worm disease, &c.* In some respects, however, it either differs from the distemper described by Dupuy, or the latter author has not very accurately described the changes which take place. He mentions, indeed, in his several inspections, in the tissue of the lungs deposits of yellow-coloured plaster-like matter, and spherical tumours of tubercular matter like pippins, like eggs, or like peas, and occasionally bodies like hydatids. And he notices that the same bodies and the same matter are deposited in the bronchial glands. He speaks also of vomicæ and tubercles in the lungs. But he nowhere notices the fact that these glandular tyromatous matters had destroyed by ulceration the walls of the bronchi, or penetrated into their interior by fungous growths, or that they were the main cause of the profuse morbid secretion furnished by the bronchial membrane.

From the appearances presented by the lung here shown, it results that the tyromatous deposit is confined almost exclusively to the bronchial glands, and does not primarily affect the tissue of the lungs. In this respect the intelligent pathologist will recognise a difference between the distemper in the ox and pulmonary consumption in the human subject.

Portal entertained the idea that tubercles of the lungs were seated in the bronchial glands. On what circumstances that learned anatomist founded this opinion I have never been able to discover. I cannot suppose that it could have been on the evidence of morbid anatomy; for inspection of the bodies of those destroyed by tubercular disease of the lungs affords no countenance to such an inference. The bronchial glands are situate on the outer aspect of the bronchial tubes, and chiefly round the large and middle-sized tubes; while the masses of aggregated tubercles are situate within the substance of the lungs; and, so far as can be judged from the observations of Schroeder, Carswell, and Cerutti, are formed at the terminal ends of the bronchial tubes.

This disease in the bronchial glands of the ox may be regarded as settling the question completely. It shows what tubercular disease in the bronchial glands would be; and it shows that

* De l'Affection Tuberculeuse, &c. p. 253, &c.

though the symptoms produced are in many respects similar, or even the same, the anatomical characters and the lesions are very different. In this disease the substance of the lungs may be entire, while the bronchial glands and tubes are irreparably injured.

Let me not, however, be misunderstood. I do not mean to deny the existence of tubercular deposit in the lungs of the ox, or of the tyromatous disease in the bronchial glands of the human subject. In man the bronchial glands are occasionally found infiltrated by this tubercular or tyromatous deposit; but it is chiefly in children that this disease is observed; and indeed it has afforded to an ingenious physician, whose loss the profession must lament, the foundation of a theory of the occurrence of *laryngismus stridulus*. In the adult, however, it is not very frequent. In the ox, on the other hand, it seems to be not uncommon.

It may be further observed that the two diseases, that is, tubercular disorganization of the lungs, and tyromatous enlargement of the bronchial glands, may exist together in children, and not unusually do exist together. This conjunction I have seen pretty often, and observed it very distinctly in a child of about 20 or 22 months, the daughter of a woman under my care in the Infirmary. The child died with the usual symptoms of wasting disease of the lungs. Upon inspecting the body I found the lungs extensively tuberculated, with one or two ragged vomicæ in the lower part of the upper lobe, and in the middle lobe of the right lung; and the bronchial glands outside the bronchial tubes much enlarged, and presenting cheesy or curd-like matter. None of these glands, however, had penetrated into the bronchial tubes, though they must have compressed them to a considerable degree.

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